

## CLAIMS

1. A method for designing an arm structure for a robot having an arm which can rotate vertically and forward over a prescribed angle around an axial line extending  
5 substantially between two shoulders, comprising the steps of:  
  
defining a vertical extent of a region in front of the robot that can be accessed by the arm in a fully extended state; and  
  
determining a length of the arm and a height of the axis of rotation of the arm in such a manner that a range of rotational motion of the arm in accessing the region can  
10 be covered by a range in which the fore-and-aft distance to the tip of the arm can be linearly approximated.
2. A method for designing an arm structure for a robot according to claim 1, wherein a height of the axis of rotation of the arm is about 910 mm, and the arm is  
15 adapted to swing vertically at least by 240 mm at its free end both upward and downward from a horizontal line.
3. A method for designing an arm structure for a robot according to claim 2, wherein a maximum tolerated error of the fore-and-aft distance of the free end of the  
20 arm is 15 mm, and the arm is at least 528 mm long, and adapted to swing at least  $\pm 27$  degrees from a horizontal line.
4. A method for designing an arm structure for a robot according to claim 2, wherein a maximum tolerated error of the fore-and-aft distance of the free end of the  
25 arm is 20 mm, and the arm is at least 422 mm long, and adapted to swing at least  $\pm 35$

degrees from a horizontal line.

5.        A method for designing an arm structure for a robot according to claim 2, wherein a maximum tolerated error of the fore-and-aft distance of the free end of the arm is 25 mm, and the arm is at least 365 mm long, and adapted to swing at least  $\pm 42$  degrees from a horizontal line.

6.        An arm structure for a robot having an arm which can rotate vertically and forward over a prescribed angle around an axial line extending substantially between two shoulders, wherein:

a height of the axis of rotation of the arm is about 910 mm, and the arm is adapted to swing vertically at least by 240 mm at its free end both upward and downward from a horizontal line.

7.        An arm structure for a robot according to claim 6, wherein the arm is at least 365 mm long, and adapted to swing at least  $\pm 42$  degrees from a horizontal line.